

Purpose

To establish the policy and procedure for conducting traffic noise studies, implementing noise abatement measures and coordinating with local municipalities and the public to protect the public health and welfare.

Policy

The Utah Department of Transportation recognizes noise generated by highway traffic may adversely impact human activity and the quality of life of residents located in the vicinity of heavily traveled roads. UDOT will install noise mitigation measures according to the guidelines and requirements set forth in the Procedure implementing this policy. The highway traffic noise prediction requirements, noise analysis, and noise abatement criteria in this regulation are consistent with *Federal Regulation 23 CFR 772 - Procedures for Abatement of Highway Traffic Noise and Construction Noise* and *Utah Code 72-6-111 & 112*.

Background

A. Applicability

1. TYPE I PROJECTS

Noise abatement will be considered for Type I projects where noise impacts are identified. See Section C for the identification criteria.

A new or proposed subdivision or other development must have a recorded plat prior to the earliest of the following:

- a. The earliest environmental approval date of the highway improvement as per completion of activity 79d (ROD for EIS) or activity 67d of the UDOT Design Process Manual.
- b. The date that the local municipality's general plan or master plan has designated the highway for major improvements.

2. TYPE II PROJECTS

Impacted residences are the primary focus of Type II noise abatement. Noise abatement will be considered for Type II projects when the following criteria are satisfied:

- a. Noise impacts meet the criteria of Section B
- b. The subdivision predates the original highway.

- c. Noise abatement criteria of Section C are satisfied
- d. The local municipality supports the proposed noise wall.
- e. Economically feasible in accordance with Subsection C.8 and the project has been placed on the STIP

Eligible projects will be assigned a calculated priority index in accordance with the following equation:

$$PI = ((Leq - 65) \times N \times T) / 100$$

where: PI = priority index
 Leq = noise level
 N = number of impacted residences
 T = time, in years, the area has been considered for abatement

The eligible areas will be ranked according to the PI value, with the greatest PI value receiving the highest priority.

The department staff will advance the prioritized list of Type II projects to the Transportation Commission annually. The Transportation Commission will place on the STIP projects selected from the prioritized list.

Projects selected by the Transportation Commission will be designed and built in accordance with procedures the UDOT Design Process Manual. Projects not selected will be carried over to the next year's list and re-prioritized along with new projects.

B. Analysis of Traffic Noise Impacts and Abatement Measures

- 1. The Department shall determine and analyze expected traffic noise impacts and noise abatement measures to mitigate these impacts.
- 2. Traffic noise impact occurs when either of the following conditions occur at a sensitive land use area:
 - a. The design noise level approaches (is within 2 dBA of) or exceeds the Noise Abatement Criterion in Table 1. (Applies to Type I projects only.)
 - b. The design noise level substantially exceeds (10 or more dBA) the existing noise level. (Applies to Type I projects only.)

- c. The existing noise level approaches (is within 2 dBA of) or exceeds the Noise Abatement Criterion in Table 1. (Applies to Type II only.)
- 3. The traffic noise analysis shall include the following:
 - a. Identification of existing activities, developed lands, and undeveloped lands for which development is planned.
 - b. Determination of existing noise levels.
 - c. Determination of traffic noise impacts.
 - d. Examination and evaluation of alternative noise abatement measures for reducing or eliminating the noise impacts.

C. Noise Abatement Criteria

The following criteria must be met before noise abatement will be implemented.

Table 1
Noise Abatement Criteria (NAC)
(Hourly A-Weighted Sound Level - decibels, (dBA))*

Activity Category	Leq(h)	L10(h)	Description of Activity Category
A	57 (Exterior)	60 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	--	Undeveloped lands.
E Interior	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

*Either Leq(h) or L10(h) (but not both) may be used on a project.

Note: Tabulated sound levels are threshold values used to define impact and where abatement will be considered. Noise abatement will be designed to achieve a substantial noise reduction - not necessarily achieving the noise abatement criteria.

1. When noise abatement measures are being considered, every reasonable effort shall be made to obtain substantial noise reductions. At a minimum, 5 dBA of noise reduction must be achieved at typical impacted residences nearest the highway.
2. In determining and abating traffic noise impacts, primary consideration shall be exterior areas.
3. A noise abatement device must be designed in accordance with the following: (1) good design practice, (2) optimal performance, and (3) current highway safety technology.
4. Aesthetics treatment, graffiti deterrence and landscaping will be considered where appropriate in consideration of design standard specifications, cost efficiency, maintenance, and local municipality regulations. Refer to Subsection D1, if these features are desired by the public and costs exceed the abatement limit of section C.8.
5. If a noise impact is identified, the following abatement measures shall be considered:
 - a. Traffic Management Measures (i.e. signing for the restriction of compression brakes).
 - b. Alteration of horizontal and vertical alignments. (Applies to Type I projects only.)
 - c. Noise barriers will be constructed when feasible within UDOT Right of way. UDOT will own and maintain the wall and associated right of way.
 - d. Instances may arise in which Department right of way is not the most prudent location for noise barriers, yet noise abatement can be feasible and reasonable if built on adjacent property (or adjacent public right of way). In these cases:
 1. The Department's cost is limited to normal cost for abatement on Department right of way.
 2. Adjacent property owners allow access and easements as necessary in order to construct and maintain the barrier.

3. Maintenance of noise walls and associated landscaping on the side facing the highway will normally be the Department's responsibility. The opposite face shall be maintained by the property owner.
6. Noise insulation of public use or nonprofit institutional structures may be considered for those cases dealing with internal traffic noise.
7. There may be situations where (1) severe traffic noise impacts exist or are expected, and (2) the abatement measures listed in Section C.5 and C.6 are physically infeasible or economically unreasonable. In these instances, alternate noise abatement measures may be proposed for Types I and II projects and approved by the Transportation Commission on a case-by-case basis when the following conditions have been met:
 - a. A severe traffic noise impact has been identified.
 - b. Alternate noise abatement measures will reduce the traffic noise impact
8. The cost per dwelling in the formula shown in the paragraph below should not exceed either of the following limits.
 - a. Abatement Limit - A cost/residence limit for fabrication and installation of noise abatement measures without appurtenances (other direct costs). This limit allows a standard 3 meters high by 70 meters long noise barrier wall configuration for each impacted residence, and cost will be calculated based on a current three-year average bid price index published annually by the Department. .
 - b. Direct Cost Limit - A cost/residence limit for noise abatement measures with appurtenances. Appurtenances are direct costs associated with the noise abatement and depend on the particular site. They may include earthwork, landscaping and associated irrigation, aesthetic or sound absorbing treatment on walls, right of way, easements for construction and/or maintenance and incidental construction costs. The Direct Cost Limit is calculated to be 30% greater than the Abatement Limit.
 - c. Cost per dwelling = $\frac{C}{SD}$

 C = Total cost of abatement.

 D = Total number of residences that will likely receive

some noticeable benefit (5 dBA or more).

S = Severity factor - An average weight applied to the number of impacted dwellings, related to the amount of noise impact. For Type-II projects, S = 1.

TABLE OF SEVERITY FACTORS, S (Applicable Only to Type-I Projects)						
Does the Design Noise Level Approach or Exceed the NAC?			Increase in Noise Level (Predicted - Existing)			
			0-9	10-19	20-29	30+
	Yes		1	2	3	4
	No		*	1	2	3

(* No traffic noise impact, so abatement is not considered)

D. Local Municipality Coordination and Participation

1. Policy For Requesting Noise Studies (Applies to Type II projects only)

- a. Local Municipality: Local municipality officials requesting noise abatement studies may contact their UDOT region environmental engineer for the necessary information and forms.
- b. Residence/Homeowner: People living adjacent to or in the vicinity of a highway they feel requires noise abatement may contact their UDOT region environmental engineer to request information for having a noise study performed in their area. Upon request, the following information will be provided to the concerned individuals.

1. Cover Letter acknowledging circumstances of request.
2. Noise Abatement Request Form.
3. UDOT Noise Abatement Policy.

Note: UDOT requires that request for noise studies be submitted by the local municipality as a demonstration of their support.

2. Local Municipality Cost Participation

In instances where abatement costs exceed the abatement limit, the local municipality may be offered the option to incur the additional cost of abatement. In order for the Department to participate in noise abatement when costs exceed abatement limits, an agreement between the local municipality and the Department must include the following:

- a. The Department's actual cost for noise abatement will not exceed the abatement limits as specified in section C.8.
- b. The participating local municipality shall pay the Department an amount equal to the estimated cost of the abatement measure and appurtenances that exceed the abatement limit.
- c. The agreement will be signed before design begins.
- d. Payment of an estimated cost shall be made to the Department before construction begins. Any variance between the estimated and actual cost will be settled at the completion of the project.
- e. The participating local municipality's final cost shall be based on actual construction costs.

3. Projects Funded from Other Sources.

The Department may construct and maintain noise abatement measures along state highways in cases where the cost for the noise abatement is provided by citizens, adjacent property owners, developers, or local municipalities; and meeting other established criteria. The Department will design, build, and maintain the abatement measure, and the local municipality acting for and in behalf of other groups will pay the department for all preliminary engineering and construction costs.

E. Traffic Noise Prediction

Any traffic noise prediction method is approved for use in any traffic noise analysis, if (1.) The methodology is consistent with the current FHWA highway traffic noise prediction model and (2.) The prediction method uses current FHWA reference energy mean emission levels as measured by current FHWA measurement procedures.

F. Public Involvement

1. The concerns of the impacted land owners/residents will be a major consideration in reaching a decision on the abatement measures to be provided.

For Type I projects: UDOT will contact the local municipality, impacted residents/landowners (on both sides of the highway), and initiate and manage the public involvement process.

For Type II Projects: UDOT will inform the local municipality of the proposed noise mitigation project and provide maps of impacted areas and noise mitigation plans for public use during project development. The local municipality is responsible for addressing issues of public support, impacted residence involvement, community values and other issues relating to the public involvement process. UDOT is available upon request from the local municipality to participate in public meetings.

2. Noise abatement will only be considered if two thirds of the impacted residents\landowners are documented to be in favor of noise mitigation and with approval from the local municipality.
3. Environmental documents will indicate those areas where the noise mitigation criteria is satisfied.

Definitions

1. **Design Noise Level** - The noise level calculated for the worst hourly traffic noise conditions likely to occur on a regular basis during the design year without noise abatement.
2. **Design Year** - The year for which the highway is designed and traffic volumes are computed. The design year is typically ten to twenty years after the time of construction.
3. **EIS** - Environmental Impact Statement
4. **Existing Noise Levels** - Noise resulting from the natural and mechanical sources and human activity considered to be usually present in the particular area.
5. **Highway** -Public way for purposes of vehicular travel, including the entire area within the right-of-way.
6. **Impacted Residence** - A resident or land owner's property which meets the criteria

specified in section B2., using noise levels that are measured at the residence or predicted with the TNM computer program.

7. **Leq** - Equivalent (average) noise level, in units of decibel (dBA).
8. **Leq(h)** - The hourly value of Leq.
9. **Municipality** - A Local City, Town, County etc. having its own incorporated government for local affairs.
10. **Receptor** - a person receiving highway generated noise on a property supporting activity categories A, B, or C in Table I.
11. **ROD** - Record of decision.
12. **Sensitive Land Uses** - Residential dwelling units or other fixed, developed sites conforming to activity category A, B, or E of Table I
13. **Severe Traffic Noise Impact** - A traffic noise impact which increases residential noise levels by 30 dBA or more over existing noise levels, or results in absolute noise levels of 75 dBA or more.
14. **STIP** - State Wide Transportation Improvement Program. This is the annually updated list of projects advancing through design to construction.
15. **TNM** - FHWA Traffic Noise Model computer program used for highway traffic noise prediction and analysis. Version 1.0 , March, 1998 or applicable revisions.
16. **Type I Project** - A project in conjunction with new highway construction or existing highway construction which significantly alters the horizontal or vertical alignment or increases the number of through-traffic lanes.
17. **Type II Project** - A project to provide noise abatement along an existing highway.

Procedures

Noise Abate

UDOT 08A2-1.1

Responsibility: Region Environmental Engineer

Actions

1. Determine if this is a Type-I project. If it is not a Type-I project, so disclose in the environmental document, ending the process with this step.
2. Determine types and numbers of sensitive land use activities (receptors) that might be impacted. If none, so disclose in the environmental document, ending the process with this step.
3. Measure or calculate existing noise levels.
4. Calculate design noise levels. Develop design noise contours. Compare design noise abatement criterion levels and existing noise levels. Identify impacted receptors. If no impacts, summarize findings for the environmental document, ending the process with this step.
5. Consider general abatement strategies, consistent with Department policy, for all impacted receptors and for each alternative, including No Action.
6. Prepare Preliminary Noise Analysis and direct its review.
7. Prepare environmental document, and include summary of the Preliminary Noise Analysis.

Responsibility: Project Manager

8. Direct the local municipality involvement process, providing information where noise abatement is likely and where it is not likely. If the Preliminary Noise Analysis shows that there are no noise impacts or that all impacts are unmitigatable, the process ends with this step.

Responsibility: Region Environmental Engineer

9. Prepare a detailed Noise Study Report after identification of the preferred alternative and approval of the final environmental document.
10. Submit Noise Study Report to Region Preconstruction Engineer for approval.

Responsibility: Region Preconstruction Engineer

11. Review and approve Noise Study Report.

Responsibility: Project Manager

12. Incorporate the Noise Study Report into Design Study Report, and submit to the Preconstruction Engineer in Project Development for approval.
13. Incorporate approved abatement measures into design plans and specifications.

Responsibility: Region Director

14. Receive and review local municipality's request for retrofit noise abatement, including the completed *UDOT Noise Abatement Request*, and mapping or other documentation which clearly describes the area requesting noise abatement. The request from the local municipality must also include supporting documentation showing that the neighborhood requesting noise abatement pre-dates the freeway or expressway as described in Background Section B.2. If the *UDOT Noise Abatement Request* and supporting documentation are complete, the Region director will authorize an initial evaluation, as described in Step 3.

Responsibility: Region Environmental Engineer

15. Conduct a limited initial evaluation to determine if the subject properties are impacted and eligible for noise abatement consideration. The initial evaluation will accomplish the following:
 - a. Define the limits of the study area.
 - b. Determine if the noise producing roadway qualifies as a highway as defined in item 5 of the Definitions Section of this policy.
 - c. Confirm that dwelling units in study area pre-date the highway as required in A.1. of the Background Section of this policy.
 - d. Confirm that the land use in the study area is residential.
 - e. Determine the number of dwelling units within the study area.
 - f. Determine if the existing noise level (Leq) exceeds the Noise Abatement Criteria Noise Level from Table 1, based on the land use category.

- g. Determine, based on this information, if the study area is eligible for further evaluation.
- 16. If the study area is not eligible for further review the process ends at this step. The local Municipality or citizens group will be notified. The notification will include an explanation of the reason(s) that the study area is not qualified for further consideration.

Responsibility: Region Director

- 17. If the study area is eligible for further review, the local municipality will be notified that the study area has met the initial screening criteria, and that a comprehensive study will be initiated pending the availability of funding.
- 18. Submit funding request for a Noise Mitigation Report to Program Development Director.

Responsibility: Program Development Director

- 19. If Type-II funds are available a project will be set up to complete a study and prepare a report which will address the following: noise level, policy compatibility, design & operational compatibility, conformity with STIP and Long Range Plan, mitigation options, and mitigation cost. This study and report will be referred to as the Noise Study Report. If funds are not available at the time the request is made, the request will be held until funds become available. Funding requests will be honored in the order in which they are received by the Program Development Director. (Note that this is funding for the Noise Study Report only. Actual mitigation projects will be prioritized and funded as described in Step 18 through Step 23 of this procedure.) The Region Director will be notified of the status of the funding request as it is processed and periodically thereafter. When funding for a specific Noise Study Report is obtained step 8 will be initiated.

Responsibility: Region Environmental Engineer

- 20. The Region Environmental Engineer will obtain all data necessary to complete the required Noise Study Report. This data will then be used to complete the following analysis:
- 21. Measurements and modeling will be completed to determine if the existing noise level approaches (is within 2 dBA of) or exceeds the Noise Abatement Criteria defined in Table I.
- 22. Review the approved STIP to determine if a noise abatement project in the study location would have a negative impact on any future project.

23. Review the MPO's Long Range Plan to determine if a noise abatement project in the study location would have a negative impact on any future plan.
24. Conduct a field review with the Region Preconstruction Engineer and the Region Traffic Engineer to determine if a noise abatement project in the study area is feasible and can meet all design and safety criteria.
25. Based on this information determine what types of noise abatement would be feasible at the study location. Modeling will then be used to determine if the noise reduction requirement defined in Section C.1 of this policy can be achieved
26. Prepare initial cost estimates of the various feasible abatement alternatives. An economic analysis will then be done to determine if the study area meets the criteria defined in Section C.8 of this policy.
27. Conduct a review to insure all other requirements for noise abatement outlined in this policy are satisfied.
28. The Region Environmental Engineer will then prepare a Noise Study Report which will summarize the study which has been conducted and present the results of all testing and analysis. If the study area is qualified for a noise abatement project, the report will define the type(s) of abatement which are feasible and effective. If the study area is not qualified for an abatement project, the reasons will be included in the report.

Responsibility: Region Director

29. If the study area is not eligible for a noise abatement project, the process ends at this step. The local municipality will be notified. The notification will include an explanation of the reason(s) that the study area is not qualified for further consideration.
30. If the study area meets the technical and economic qualifications for a noise abatement project as outlined above, the local municipality will be informed that the neighborhood has met the policy requirements and will be advanced into the Funding Candidate pool
31. The Region Director will notify the Program Development Director and the Chief Environmental Engineer that the project is to be placed in the Funding Candidate Pool.

Responsibility: Program Development Director

- 32. A Funding Candidate Pool will be maintained. Once a proposed project is placed in this pool it will not be removed until it is funded unless there is a significant change in conditions which lead to a reevaluation of its eligibility.
- 33. The Program Development Director will meet annually with Chief Environmental Engineer and the Region Environmental Engineers who have projects in the funding candidate pool. They will evaluate and prioritize the projects based on the criteria found in Section A.2.e of this policy. This evaluation will also assure that the methodology used to measure and calculate the noise impacts are consistent for each project. Modeling for each project will be updated with current traffic volumes at a LOS C prior to this meeting.
- 34. The prioritized list will be forwarded to the Transportation Commission.

Responsibility: Transportation Commission

- 35. Upon receipt of the annual prioritized list, the Commission will select which projects will be funded. Unfunded projects will remain in the Funding Candidate Pool to be re-evaluated at the next annual meeting.

Responsibility: Program Development Director

- 36. Projects which have been selected by the Commission for funding will be set up as projects in UDOT's program.

Responsibility: Region Preconstruction Engineer

- 37. The project will be advanced according to the Preconstruction Process Manual. The Noise Study Report will be incorporated into the required Preconstruction Process Manual reports as appropriate.